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Sea Grant North Carolina BLUEPRINTS

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Bycatch Reduction in the Shrimp Fishery

Reduced-Grid Turtle Excluder Device Decreases Bycatch Without Shrimp Loss

Results from a North Carolina Fishery Resource Grant Project

Shrimp Trawling

In 2011, shrimp was North Carolina's second most economically valuable fishery. The state's penaeid shrimp fishery consists of three species: brown shrimp (*Farfantepenaeus aztecus*), white shrimp (*Litopenaeus setiferus*) and pink shrimp (*F. duorarum*). Average annual landings from 1962 to 2010 were 6.4 million pounds (N.C. Division of Marine Fisheries, 2012).

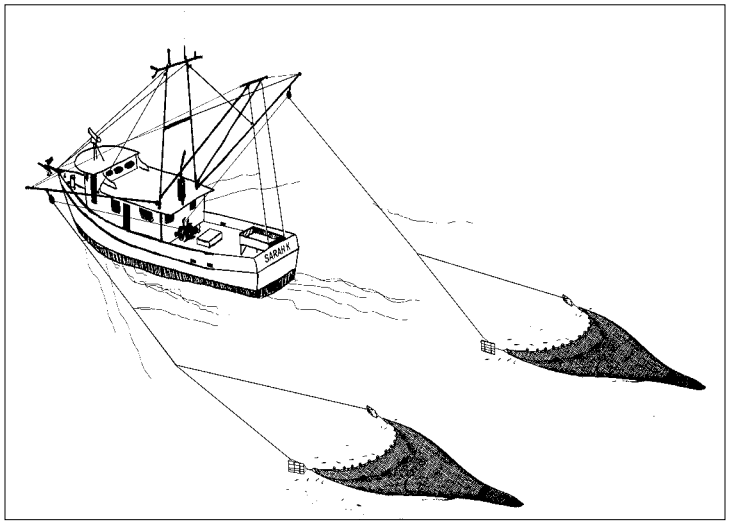
The vast majority of shrimpers — about 92 percent — use otter trawls (NCDMF, 2012) because this gear is effective at capturing all three shrimp species under most conditions. However, otter trawls are generally not very selective and often capture unintended catch, or bycatch, in addition to shrimp and marketable finfish. Since 1992, federal regulations have required the shrimp industry to use turtle excluder devices (TEDs) and bycatch reduction devices in trawls to minimize encounters with sea turtles and finfish.

The shrimp industry has conducted bycatch reduction research through gear modification for many years. From an economic perspective, bycatch can increase a shrimp trawler's operating cost because it takes extra fuel to pull heavier nets and additional time for crew to cull the catch. Large amounts of bycatch also can crush shrimp, resulting in inferior product.

In the U.S. shrimp fishery, the maximum spacing allowed between TED grids is 4 inches (TED regulations, 2008). In 2010, John Broome, and Julia and Donna Anderson received funding from the N.C. Fishery Resource Grant Program to test a narrower-grid TED. They sought to determine if a 2-inch reduced-space grid TED could catch shrimp as well as a traditional 4-inch TED, while reducing bycatch.

Methods

The shrimpers used a 35-foot shrimp trawler with two identical 42-foot mongoose nets pulled from the stern with a sled in the middle. One net was equipped with the experimental 2-inch TED and the other had a traditional 4-inch TED. They collected data from 43 tows in the ocean from one-half mile north of Carolina Beach Inlet to Lockwood Folly Inlet between September and December 2010.



This shrimp trawler pulls two otter trawls. Courtesy NCDMF.

Tows lasted approximately 90 minutes. After each tow, catch from each net was culled individually and the contents were weighed separately. The researchers recorded the total weight of bycatch and shrimp, as well as the number of marketable finfish from each net. Bycatch from each net was subsampled using one 35-pound shrimp basket and identified to species when possible.

Before each day's testing, TEDs were swapped between nets using a TED zipper, and each tickler chain was measured in order to maintain the proper setting. At the study's midpoint, the nets were swapped in order to eliminate any unknown bias associated with trawl-door operation. A try net typically fished from the port side of the vessel was not used during this study because it could have reduced the catch in the port net.

Gear and Equipment

Two identical 42-foot, 1-and-7/8-inch Spectra mongoose nets built by Steve Parrish of S&S Trawl Shop in Supply, N.C., were used for the tests. New 3/16-inch stainless-steel tickler chains set 30 inches ahead of the trawl chain line were used. The fishing vessel was rigged as a stern trawler with two 7-feet by 3-feet wooden doors with stainless-steel runners and a 6-foot stainless-steel sled (dummy door). New 5/16-inch stainless-steel towing cable was installed on the trawl winch. New tongue